REMARKS

Reconsideration of the pending claims is respectfully requested in view of the above amendments and following remarks.

In the office action mailed 07 September 2007 the Examiner allowed claims 3-7, 9-13 and 16-21, subject to amending the phrase "essentially capable" to "capable" in each of claims 16 and 21 to effect clarity, which was duly effected, with no further amendments to the claims. Claim 21 has now been amended by the incorporation of previously allowed claim 13 such that the claim is now directed to the one or more porous hydrophilic polymer ink receiving layer *consisting essentially* of a porous foamed hydrophilic polymer.....*and, optionally, a surfactant*. An analogous claim 22 is here presented in which the optionality is directed to a crosslinker or a crosslinker and a surfactant. In accordance with the above, claims 3, 4 and 13 have been cancelled and minor amendments made to claims 7 and 9 as indicated.

Entry of the present amendments is respectfully requested, since they address the reasons for rejection raised in the office action, eliminate issues by clearly distinguishing from the cited reference and place the application in order for allowance.

In the office action mailed 29 October 2007 the Examiner reported that all prior grounds of rejection had now been overcome but raised four nonstatutory obviousness-type double patenting rejections, in response to which Applicant filed four terminal disclaimers. In the office action mailed 30 January 2008 the Examiner withdrew the double patenting rejections in the light of Applicant's acceptable terminal disclaimers.

Rejection under 35 U.S.C 103(a)

The Examiner has now rejected previously allowed claims 3-7, 9-13 and 16-21 under 35 U.S.C. 103(a) as being unpatentable over newly cited Iwasa *et al.* (US 2002/0012786). She has also cited Toda *et al.* (US 2005/0276935), although this has a later priority date than the present application and published after the filing date therefore, and so cannot therefore be properly combined with Iwasa *et al.*

The Examiner submits that Iwasa *et al.* disclose a porous resin film having a minimum porosity of 10%, the film being a mixture of hydrophilic and non-

hydrophilic resin components and being suitable for use in a recording medium for ink jet printing. The hydrophilic resin may be polyvinyl alcohol and the support may be polyester. She states that the examples do not specifically mention the use of a fluorosurfactant or a crosslinker for the hydrophilic resin but that these additives are commonplace in the art and has cited Toda *et al.* to illustrate this point.

The present invention as now defined relates to an ink jet recording medium including one or more porous hydrophilic polymer ink receiving layers consisting essentially of a porous foamed hydrophilic polymer in which the hydrophilic polymer is swellable and optionally a surfactant and/or a crosslinker

The porous film (i) of Iwasa *et al.* consists of 30-90% of a thermoplastic resin, which comprises both hydrophilic *and* hydrophobic resin components, compounded with 70-10% of an inorganic or organic fine powder [0008-0009]. A base layer including a resin film (ii) may be present under such a porous film and may comprise 40-100% of a thermoplastic resin and 60-0% of the powder. Both films are preferably stretched [0010 and 0012].

Porous film (i) preferably comprises 5 to 100 weight parts of a hydrophilic component, preferably an alkylene oxide-base polymer, per 100 weight parts of non-hydrophilic component, preferably a polyolefin base. Thus even if there were equal parts of hydrophilic and hydrophobic components in the extreme position, the *maximum* amount of hydrophilic component in the porous resin film (i) if the amount of total resin in the film were 90% would only be 45%. The amount of hydrophilic content can however be as low as 1.5%. According to [0029] preferably there is only up to 60 weight parts of the hydrophilic component to 100 parts of the non-hydrophilic resin, giving a preferred range of hydrophilic resin in the film (i) of only about 3 to 33%. This accords with the examples wherein from 8% (Example 5) to 20% (Example 12) is used.

Independent claims 16 and 21 now require, however, that the one or more porous ink receiving layers consist essentially of a porous foamed hydrophilic polymer, i.e. any non-hydrophilic component would be minimal and non–essential. Iwasa *et al.* however clearly show that not only is the porous resin film (i) required to have at least an equal amount of non-hydrophilic component to hydrophilic component, and preferably considerably more, but also that the film has to contain at least 10 to 70 wt.% of an inorganic or organic fine powder. Paragraph [0045] clearly states that less than 10% of fine powder tends to degrade the ink drying property.

Indeed [0113] states that the examples show, in comparison with the comparative examples, that the stretched film containing no fine powder showed poor ink drying property and a large non-uniformity in printing density. Moreover although some hydrophilic resin is required, this is only present in a lesser amount than the non-hydrophilic resin. For assistance in reading the Tables, Applicant kindly refers the Examiner to pages 12-14 of the equivalent EP specification, EP-A-1 160 273, as attached, which she may find easier to interpret.

It is not reasonably anticipated that one of ordinary skill in the art, from the disclosure of Iwasa *et al.,* would be lead to omit the essential inorganic or organic powder from resin film (i). Nor is there any expectation that he would be lead to exclude the requisite equal or greater amount of hydrophobic polymer component in the resin film. Thus it is respectfully submitted that the examiner has not established a *prima facie* case of obviousness for a claim which requires that the film consist essentially of a hydrophilic polymer with certain optional but specifically stated additives over a disclosure which specifically requires that more than half of the wt% of the film must be composed of two other essential components.

Moreover although the film of Iwasa *et al.* is clearly porous, it is only in [0054] that it is disclosed that the porosity in porous film (i) can be attained by film stretching, by foaming using a foaming agent or by a method using pore-containing grains. A definite preference for film stretching is stated and indeed Table 1 shows that in each of the examples the film has been stretched by a stretching factor. Paragraph [0045] specifically recites that stretching the resin film (i) will ensure excellent ink absorbing and drying properties. Paragraphs [0055] to [0059] provide considerable details on how this stretching may be achieved. However there is no enablement whatsoever of the formation of porosity by the use of a foaming method, nor any indication of how that may be achieved.

The Examiner has also referred to the fact that there may be present a base layer. Paragraph [0060] states that the base layer on which the resin film (i) may be stacked may comprise, for example, a polyester film, cloth or a metal plate. However preferably such a base layer comprises a resin film (ii) which can contain up to 100 wt% thermoplastic resin, the film being preferably stretched [0010].

According to [0013] this may be composed of any one of a non-hydrophilic thermoplastic resin, a hydrophilic thermoplastic resin, or a mixture thereof, or a mixture of any of these with an inorganic or organic powder. This is

contradicted, however, by [0062] which states that it may (only) be composed of a non-hydrophilic thermoplastic resin or powders, or a mixture of a non-hydrophilic thermoplastic resin and a hydrophilic thermoplastic resin, (but not the latter alone). In a mixture of such resins, as with resin film (i), the hydrophilic component cannot exceed the amount of non-hydrophilic component [0062].

Although the disclosure is such that no powder theoretically need be present in resin (ii), less than 15% is contra-indicated as resulting in insufficient pore formation. Thus a *porous* resin film (ii) requires the presence of powder as an essential component. Additionally there is no hint, teaching or suggestion that the resin film (ii) may be foamed. The reference to foaming in [0054] specifically refers only to resin film (i). Thus with regard to the independent claims, a base layer, if present, is not porous unless a significant proportion of a powder is present and any porosity is disclosed only as being produced by a stretching means. It is submitted therefore that the Examiner cannot equate the base layer of Iwasa *et al.* with a porous ink receiving hydrophilic layer comprising a porous foamed hydrophilic polymer of the present invention.

Thus neither a layer comprising porous resin film (i) nor (ii) of Iwasa *et al.* when included in an inkjet recording medium together with a support is such that it anticipates or renders obvious any of the claims of the present invention.

In view of the foregoing amendments and remarks, it is believed that the application is in order for allowance. Especially on account of the very protracted nature of this prosecution, prompt and favorable action by the Examiner is earnestly solicited. Should the Examiner require anything further, she is invited to contact Applicant's representative.

Respectfully submitted,

Arthur E. Kluegel
Attorney for Applicant(s)
Registration No. 25,518

Arthur E. Kluegel/clb
Telephone: (716) 477-2625
Facsimile: (716) 477-1148

If the Examiner is unable to reach Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

Enc. Attachment – pages 12-14 of EP 1 160 273

Table 1

		unit	Example 1	Comparative Example 1	Comparative Example 2	Example 2	Example 3	Example 4	Example 5
Compounded component	<Non-hydrophilic thermoplastic resin component> Polypropylene content	wt%/weight part	38/100	50/100	76/100	41/100	34/100	32/100	32/100
	<Hydrophilic resin> Species (abbrev.)	–	PEPO1	–	PEPO1	PEPO1	PEPO1	PEPO1	PEPO1
	Content	wt%/weight part	12/32	–	24/32	9/22	16/43	18/56	8/56
	<Fine powder> Content of calcium carbonate 1	weight part	50	50	–	50	50	50	50
	<Dispersion modifier> Species (abbrev.)	–	–	–	–	–	–	–	–
	Content	weight part	–	–	–	–	–	–	–
Forming conditions	Temperature a1	°C	158	158	–	158	158	158	158
	Temperature b1	°C	90	90	–	90	90	90	90
	Stretching factor	times	6	6	–	6	6	6	6
	Types of surface oxidation treatment	–	–	–	–	–	–	–	–
	Energy for surface oxidation treatment	$W \cdot min/m^2$	–	–	–	–	–	–	–
Evaluation results of the films	Average surface contact angle to water	°	80	114	41	83	67	65	80
	Difference between maximum and minimum values of contact angle to water	°	8	2	12	7	8	9	7
	Porosity	%	32	32	0	30	31	33	55
	Ink drying property (monochromatic 50%)	–	0	6	6	0	0	0	0
	Ink drying property (monochromatic 100%)	–	0	6	6	0	0	0	0
	Ink drying property (multi-color 200%)	–	0	6	6	1	0	1	2
	Non-uniformity in density	–	1	4	4	2	1	2	2
	Film thickness	μm	310	257	1007	382	298	265	482

Table 1 (continued) * L = longitudinal, T = transverse

		unit	Example 6	Example 7	Example 8	Example 9	Example 10	Comp. Example 3	Example 11	Example 12
Compounded component	<Non-hydrophilic thermoplastic resin component> Polypropylene content	wt%/weight part	38/100	38/100	38/100	38/100	38/100	50	38/100	30/100
	<Hydrophilic resin> Species (abbrev.)	—	PEPO1	PEPO1	PEPO1	PEPO1	PEPPO1	—	PEPO2	PEPO3
	Content	wt%/weight part	12/32	12/32	12/32	12/32	12/32	—	12/32	20/67
	<Fine powder> Content of calcium carbonate 1	weight part	50	50	50	50	50	50	50	50
	<Dispersion modifier> Species (abbrev.)	—	EX1	EX2	P-1	—	—	—	—	—
	Content	weight part	3	3	0.5	—	—	—	—	—
Forming conditions	Temperature a1	°C	158	158	158	160	158	158	158	156
	Temperature b1	°C	90	90	90	90	90	90	90	90
	Stretching factor	times	6	6	6	L6,T6*	6	6	6	6
	Types of surface oxidation treatment	—	—	—	—	—	corona discharge	corona discharge	—	—
	Energy for surface oxidation treatment	$W \cdot min/m^2$	—	—	—	—	80	80	—	—
Evaluation results of the films	Average surface contact angle to water	°	80	80	80	95	48	76	76	78
	Difference between maximum and minimum values of contact angle to water	°	5	5	4	6	6	2	7	11
	Porosity	%	32	32	32	75	32	32	35	30
	Ink drying property (monochromatic 50%)	—	0	0	0	0	0	6	0	0
	Ink drying property (monochromatic 100%)	—	0	0	0	1	0	6	0	0
	Ink drying property (multi-color 200%)	—	0	0	0	3	0	6	0	2
	Non-uniformity in density	—	1	1	1	2	1	4	1	2
	Film thickness	μm	300	300	310	188	310	257	344	310

Table 2

		unit	Example 13	Example 14	Example 15
Compounded component	<Non-hydrophilic thermoplastic resin component> Polypropylene content	wt%/weight part	40/100	40/100	40/100
	<Hydrophilic resin> Species (abbrev.) Content	— wt%/weight part	PEPO1 10/25	PEPO1 10/25	PEPO1 10/25
	<Fine powder> Content of calcium carbonate 2	weight part	50	50	50
Forming conditions	Temperature a	°C	250	250	250
	Temperature b	°C	50	50	50
	Temperature c	°C	154	154	154
	Temperature d	°C	155	155	155
	Temperature e	°C	55	55	55
	Types of surface oxidation treatment	—	—	corona discharge	corona discharge
	Energy for surface oxidation treatment	W · min/m²	—	90	60
Evaluation results of the films	Average surface contact angle to water	°	96	60	61
	Difference between maximum and minimum values of contact angle to water	°	11	8	8
	Internal porosity of porous resin film (i)	%	58	58	58
	Ink drying property (monochromatic 50%)	—	0	0	0
	Ink drying property (monochromatic 100%)	—	0	0	0
	Ink drying property (multi-color 200%)	—	0	0	0
	Non-uniformity in density	—	1	1	1
	Thickness of stacked material	μm	123	123	123
	Thickness of porous resin film (i)	μm	58	58	58
	Thickness of resin film (ii) (base layer)	μm	44	44	44

[0087] As is clear from Table 1, the porous resin films (Examples 1 to 12) of the present invention show excellent ink absorbing and drying properties even when the ink discharge is large, and also show a small non-uniformity in the printing density. On the contrary, the resin film containing no hydrophilic resin (Comparative Example 1) and the multi-layered stretched resin film containing no fine powder (Comparative Example 2) only showed a poor ink drying property and a large non-uniformity in the printing density.

[0088] When compared between those subjected to the surface oxidation treatment, the porous resin film of the present invention (Example 10) was superior in the ink drying property and uniformity in the printing density to the film containing no hydrophilic resin (Comparative Example 3).

[0089] Moreover, the stacked material using the porous resin film of the present invention (Examples 13 to 15) also showed excellent ink absorbing and drying properties and a small non-uniformity in the printing density.

Industrial Applicability

[0090] A porous resin film of the present invention shows quite excellent ink absorbing and drying properties even when a large amount of ink is discharged thereon, and can be fabricated at a low cost. Using such porous resin film